USER MANUAL FOR SUBSEA SAW 30-120 mm

Document title	:	*UMA-IKM-1070377 Subsea Saw*
IKM TECHNOLOGY AS ref.	:	*IKM-1070377*
Customer ref.	:	*Subsea Saw*

IKM Technology AS

Rev.	Date	Reason For Issue	Prepared	Checked	Approved
01	03.10.2019	Issued for use	ML	TSH	SS

1 GENERAL INFORMATION

This manual is a user manual for the hydraulic subsea saw 30-120mm.

The Subsea Saw has a rotating blade, which is 250-355 mm in diameter. It is built to be used with an ROV, controlled by manipulators and with a hydraulic supply from the ROV to operate the saw.

It is designed to cut steel pipes/profiles armored cable and flexirisers. Standard blades supplied with the saw are carbide and diamond types. The saw has clamps to hold on to the object which is being cut. The clamps can be replaced if a specific interface is required.

1.1 Abbreviations

HPU	Hydraulic Power Unit
ROV	Remotely Operated Vehicle
kg	Kilo gram
mm	Milli meter
BSP	British standard pipe
JIC	Joint industry council
CCM	Cubic centimeter
LPM	Liter per minute
Nm	Newton meter
CCW	Counter clockwise

1.2 References

Doc nr	Description	Rev.	Issued	Can be found
IKM-1070377	Drawings of Subsea Saws			Appendix A
	Hydraulic Schematic			Appendix B

2 TECHNICAL SPESIFICATION

The main components on the Subsea Saw is a steel frame, cutting blade, clamps with hydraulic cylinders to hold on to the object being cut and an Eaton hydraulic motor attached to a cylinder that regulates the cutting feed.

Hydraulic supply and control of the Subsea Saw is by means of and through the ROV system. Recommended cutting diameter is set to 30-120 mm.

Weight:

Saw:	In air:	In water:
IKM-1070377	37 kg	28,3 kg

Maximum dimensions:

Saw:	Length:	Width:	Height:
IKM-1070377	620 mm	318 mm	351 mm

Hydraulic/motor:

Motor	Eaton
Work/max pressure	125/165
Flow	Min 45-70 LPM
Rec. feeding rate	10-15 mm/min
Connections	Various JIC and BSP

Cutting diameter:

Saw:	Min:	Max:
IKM-1070377	30 mm	120 mm

3 SAFETY

3.1 General – Operations

Only authorised and qualified personnel should work on the hydraulic saw system, and take suitable precautions to prevent any potential injuries. Always adhere to authorised working practices, and use the correct PPE and tools for the job. To facilitate this, make sure that these are available before commencing the test.

Ensure that the working area is kept clear and uncluttered.

3.2 General – Hydraulic

Do not work on pressurised systems. Hydraulic systems contain a large amount of stored energy when pressurised, therefore the system (including any accumulators) should be de-pressurised, and the power pack switched off, prior to working on the system. Exceptions to this would be system adjustments to components requiring the presence of pressure and/or flow.

Any personnel authorised to work on the system must have a complete understanding of the operation of the hydraulic system, so that they will be aware of any system liable to remain pressurised or hazardous in any other way. Ensure that all personnel are clear of any mechanical/hydraulic system likely to move if pressure to system actuators is released or applied.

Do not attempt to tighten any leaking fittings whilst under pressure. A hose/fitting rupture could result, leading to injury from flying components and/or oil jets.

Regularly inspect fittings and pipe-work for mechanical damage. If any such damage is found, the item must be repaired or replaced as necessary before pressure is applied to the system. Do not allow damaged fittings to remain in service.

Take care when inspecting, commissioning, repairing or maintaining the system to avoid jets of oil issuing from open orifices; pipe ends etc. if pressure is applied. Particular care should be taken to protect the eyes.

Hydraulic components may be heavy and slippery when covered in oil. Ensure that adequate protective clothing and footwear is used.

Any moving component should be treated with caution when the system is pressurised during operation, and especially during on-deck testing and repair. Keep clear of all moving components, and take all necessary precautions to avoid injury when working on these systems by preventing movement of any components likely to cause injury.

3.3 General – Mechanical

Beware of and keep clear of all moving components. Do not work on the system whilst power is applied, or if there is any potential for components to move.

Ensure that all load bearing components are adequately and regularly inspected. If damage is found the component must be repaired/replaced as necessary. Do not allow damaged components to remain in service.

Always ensure that items are correctly and adequately supported before removal, and that authorised lifting equipment and procedures are used.

Note: trying to lift heavy components in an awkward position by hand without the assistance of correct lifting equipment, or lifting any component without adopting the correct stance, can lead to serious injury.

Ensure that when working within or underneath the machine that your presence is known to your supervisor. If working underneath the machine, always ensure that there are no loose or unsupported assemblies, components or tools above.

3.4 Subsea Saw

The Subsea Saw is a rotating cutting tool and damage to health, life and property can occur if rules are not properly followed. The Subsea Saw should be secured in a vice or similar prior to connection to hydraulic power. The worksite is to be secured prior to adding power to the unit.

4 OPERATIONAL DESCRIPTION

The following description is a generic description of preparation and use of the hydraulic subsea saw 30-120mm. Customers are advised to adapt the following information to their own specific operations and specific work area.

4.1 Preparation on the vessel prior to operations

- Unpack all parts and check for transport damages
- Verify that all parts on equipment list is present
- Check the cutting blade for damage.
- Check that the blade is installed correctly, not loose and correct direction.
- Check all hoses and fittings for damage and leaks.
- Check that all bolts are in place and tight.
- Connect the hydraulic hoses to the ROV corresponding hydraulic system.
- Ensure that the piston on the feed cylinder is fully retracted.

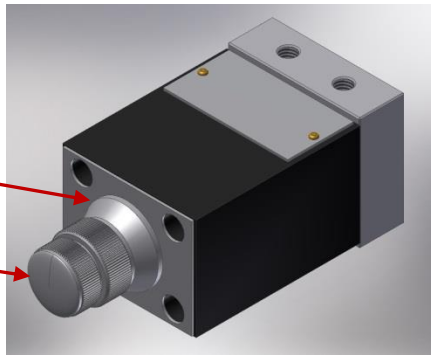
Function test:

- Do not start the saw on deck without securing the area.
- Run the clamp cylinders to full stroke.
- Time the motor feed rate.
- If the motor feed rate is to fast/slow, adjust it using the feed flow regulator and try again. (This is also dependent on the ROV flow and pressure).

4.2 Feed flow regulator

Adjustment flow wheel:

Locking wheel:



- The regulator can be adjusted to change the feed rate.
- Start by loosening the locking wheel CCW while holding the adjustment flow wheel from turning.
- Adjust the flow wheel in small increments.
- Apply adequate lubrication to thread and spring washer. Recommended lubrication: Aqua lube/aqua shield.
- Make sure spring washer is in place before tightening together again.

4.3 Subsea use

- Ensure all the checks and preparations have been performed.
- Ensure the saw is securely fastened to the ROV using the designated ROV handles.
- OR it is securely connected to a crane.
- Lower the saw into position.
- Run the clamp Actuators to lock it around the area of object to be cut. (Ensure it is securely fastened)
- Run the saw, this will cause the feed cylinder to activate.
- Perform the cut.
- When the cut is finished retract the saw blade.
- Retract the cylinders for the clamp.
- Return to deck and perform “After operations maintenance”.

5 MAINTENANCE

Repair and maintenance work on the saw shall only be performed by qualified personnel, specifically trained on this equipment.

5.1 After operations

- Flush clean hydraulic oil through the saw
- Plug hydraulic hoses to prevent hydraulic leaks and dirt to enter the hydraulic system.
- Clean the tool with fresh water. Apply an anti-corrosive layer on the tool when it is clean (WD40 or similar).
- Check hydraulic hoses, bolts, etc for damage.
- Check the cutting blade for damage.
- When stored make sure the cylinders is fully retracted, to avoid corrosion.
- Place tool in its original transport case/storage box and secure with straps.

5.2 Periodic maintenance

- Start with “After operations” maintenance procedure.
- A careful review of the entire tool is mandatory. This includes a visual check of the tool with hoses and a function test. Be sure that there is no leaks and that the feeding rate is correct.
- Replace or fix parts if needed. Damaged paint must be repainted.

5.3 Repair work

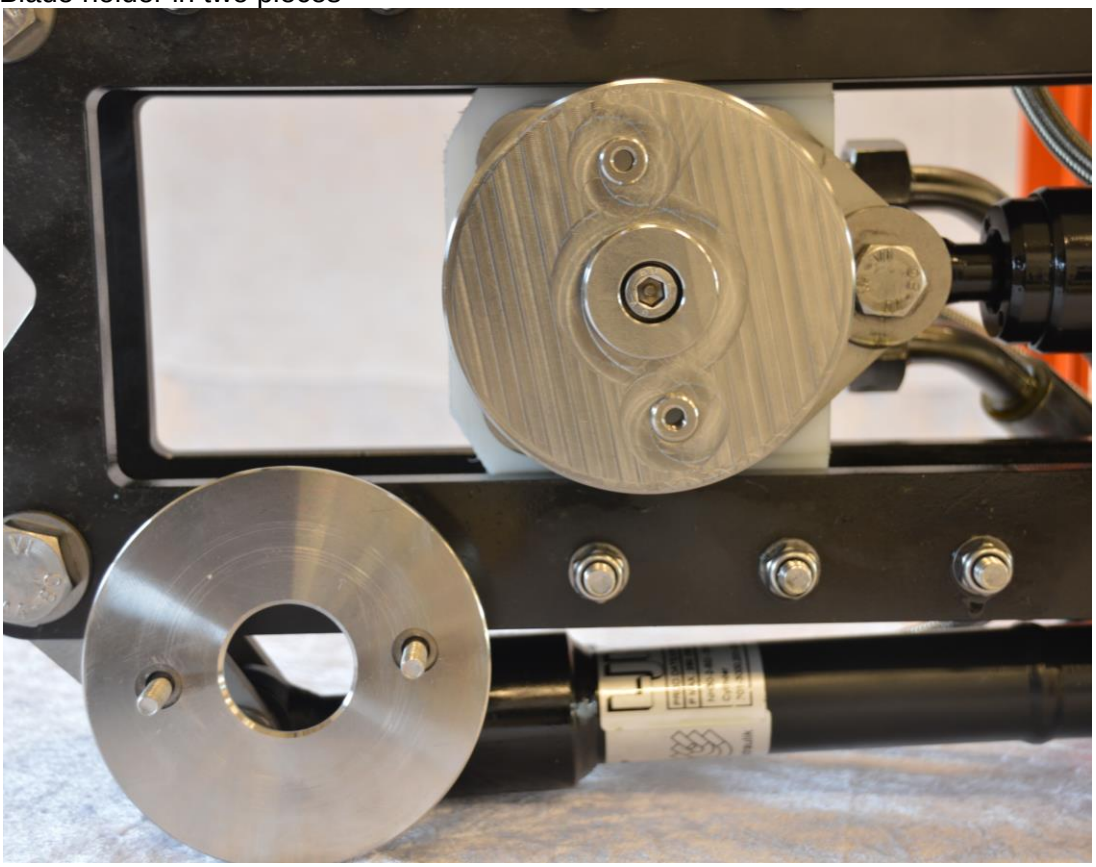
Condition for repair work:

All hydraulic connection removed from the Subsea Saw
Cutting blade edge secured or blade removed

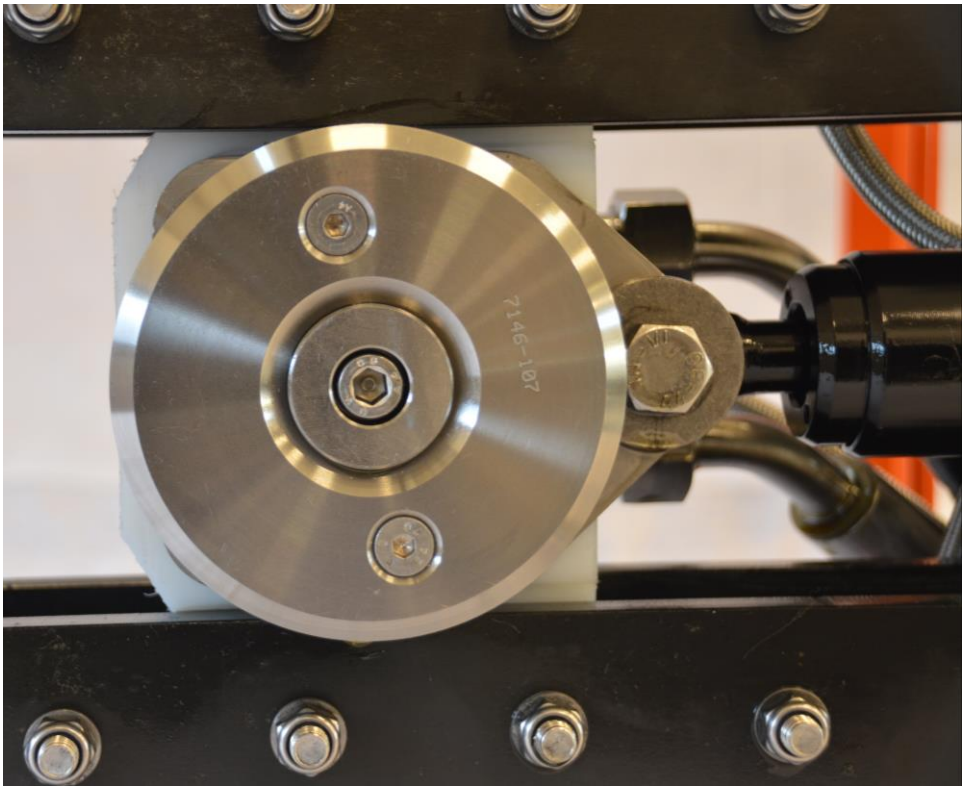
5.4 Replacement of blade

Each saw is delivered with a blade attached to the saw. In order to replace the blade, unscrew the two M6 countersunk bolts in the blade holder. The blade is now loose and can be removed from the saw.
In order to install a new blade, make sure the blade is orientated in the correct cutting direction.
Install the bolts in reverse of removing the blade.
Tighten bolts

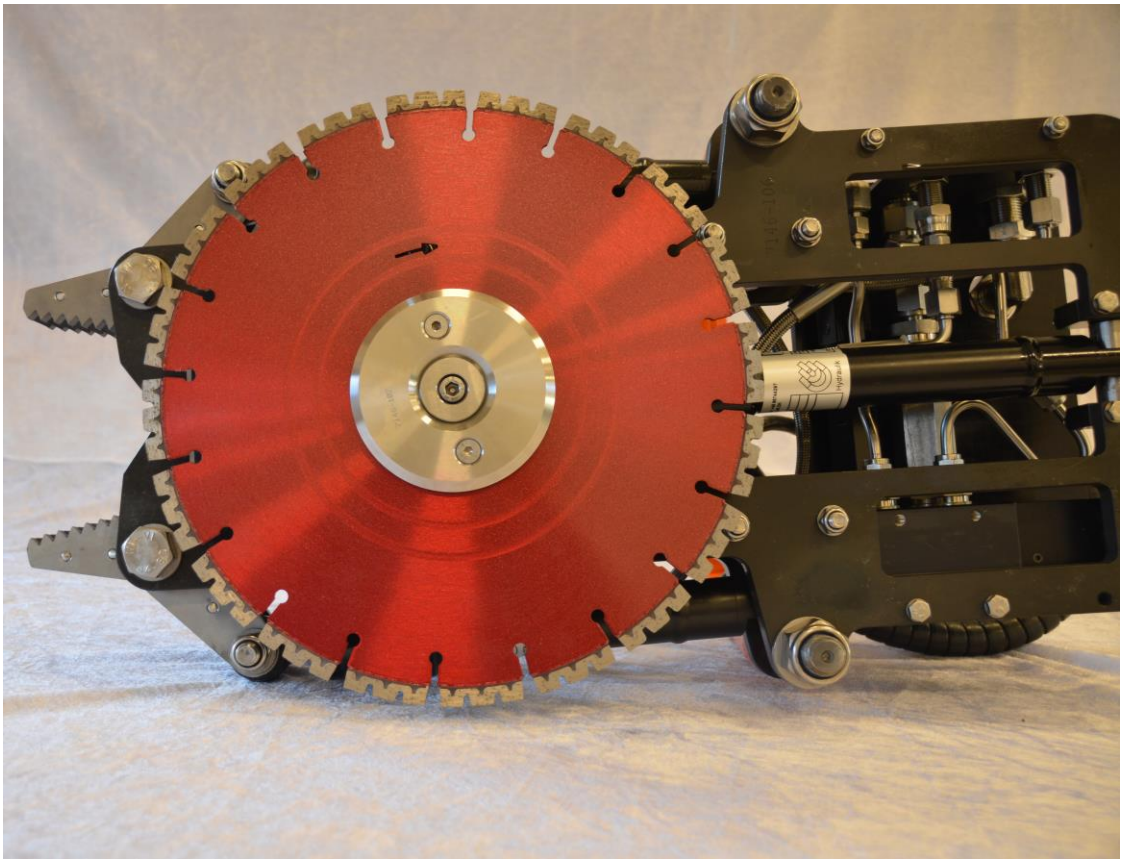
Blade holder in two pieces



Blade holder assembled



New blade installed



5.5 Replacement of motor

The motor is normally an item that will outlive the saw. However, in case it has been subject to contaminated oil, overpressure or other uncontrolled conditions, the motor might need to be replaced.

- Remove blade as per 6.1
- Disconnect hydraulic hose connection and blank both sides with blind caps.
- These same applies to the case drain connection on the top of the motor.
- Remove bolt attachment between feed cylinder and motor interface.
- Remove centre bolt on blade holder if not already done
- Remove four bolts from the underside of the saw. These bolts attach the motor to the slider (white of colour)

5.6 Replacement of gripper

The two grippers are replaceable and must be disconnected from their hinge points and the cylinder rod. First unscrew the bolt connection on the cylinder rod end. Then the connection/hinge point is unscrewed. The grippers are now loose.
To install grippers, insert the gripper between the body plates of the cutter and install the bolt connection. Nuts to be positioned on the upper side.

5.7 Replacement of gripper cylinders

Disconnect hydraulic hose connection and blank both sides with blind caps.
Disconnect the bolt connection of the cylinder rod and Gripper as per 6.3
Disconnect the retaining ring on the end of each cylinder and remove the cylinder.
Installation is the reverse way

6 SPARE PART LIST

- Cutting blade
- Nuts and bolts.
-
-
-
-

7 REVISION CHANGES

Revision	Procedure change	Author
01	*Original version*	KF

8 CONTACT INFORMATION

All enquiries relating to the tooling should be addressed to:

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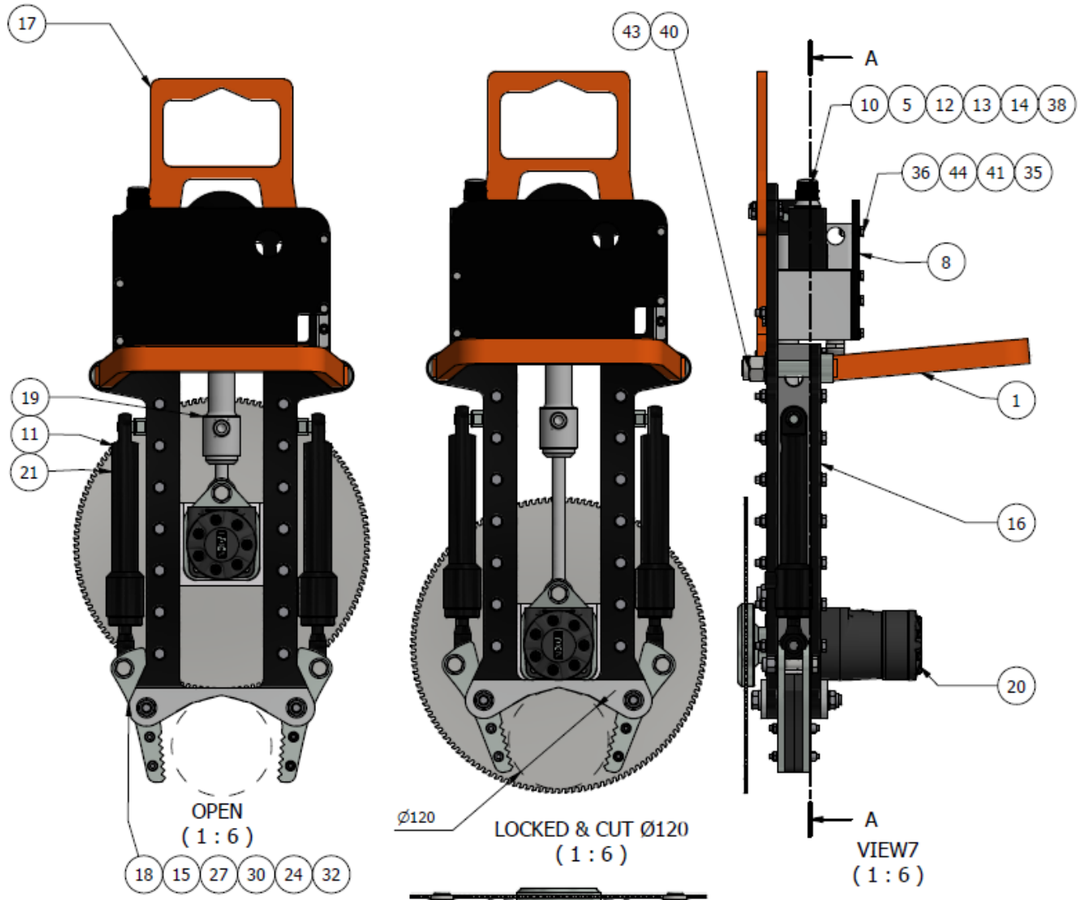
9 APPENDIX

	Doc number	Description	Rev
Appendix A	*IKM-1070377*	*Drawings Subsea Saw 30-120 mm*	

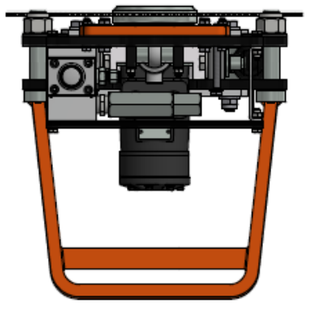
Appendix A



OPEN
(1 : 6)

LOCKED & CUT Ø120
(1 : 6)

VIEW7
(1 : 6)



VIEW8
(1 : 6)

PARTS LIST

ITEM	QTY	PART NUMBER	TITLE	MATERIAL	MASS
1	1	7146-004	HANDLE	Welded Stainless Steel, 440C	3.39 kg
2	1	7146-111	SLIDER SHAFT	Stainless Steel, S165M	0.08 kg
3	1	7146-112	DISTANCE	Stainless Steel, S165M	0.02 kg
4	2	7146-113	CYLINDER SHAFT	Stainless Steel, S165M	0.12 kg
5	1	7146-121	Valve Block	Aluminium, 6082-T6	1.1 kg
6	1	7146-122	BRACKET	Aluminium, 5052-0	0.09 kg
7	1	7146-123	WASHER	Aluminium, 5052-0	0 kg
8	1	7146-124	TOP COVER	POM-C (black)	0.46 kg
9	2	DIN 471 - 12x1		Steel, Mild	0 kg
10	1	IKM-1047833	FLOW CONTROL VALVE	As Supplied	0.2 kg
11	1	IKM-1047848	Saw Blade - 10002 - Ø355 (14" Inch) Carbid Blade	Steel, S355J2	2.24 kg
12	1	IKM-1048753	PRESSURE RELIEF VALVE, LINE MOUNTED - SVC56C	Stainless Steel, AISI 316L	0.38 kg
13	2	IKM-1049524	Male Connector, ¼" Tube OD x ¼" BSP	Stainless Steel, AISI 316L	0.05 kg
14	1	IKM-1057506	CHECK VALVE G 1/2" BSP - FT2260/6-12	Stainless Steel, AISI 316L	0.37 kg
15	2	IKM-1057992	CLAW ASSEMBLY		0.73 kg
16	1	IKM-1070379	SUBSEA FRAME		5.06 kg
17	1	IKM-1070405	REAR HANDLE	Aluminium, 6082-T6	0.7 kg
18	2	IKM-1070410	BACK STOP	Stainless Steel, AISI 316L	0.39 kg
19	1	IKM-1070411	CYLINDER - NH30-SD-25-16 X 150-S		0.24 kg
20	1	IKM-1070963	SAW & MOTOR BRACKET		2.94 kg
21	2	IKM-6009695	Cylinder Double Acting		0.24 kg
22	4	IKM-7000010	WASHER - DIN 125 - A 6,4 A4	A4	0 kg
23	4	IKM-7000012	WASHER - DIN 125 - A 8,4 A4	A4	0 kg
24	4	IKM-7000014	WASHER - DIN 125 - A 13 A4	A4	0.01 kg
25	2	IKM-7001418	HEX-HEAD BOLT - DIN 931-1 - M6 x 35	A4	0.01 kg
26	2	IKM-7001433	HEX-HEAD BOLT - DIN 931-1 - M8 x 35	A4	0.02 kg
27	2	IKM-7001467	HEX-HEAD BOLT - DIN 931-1 - M12 x 100	A4	0.11 kg
28	2	IKM-7003023	HEX NUT FLANGED - DIN 985 - M6	A4	0 kg
29	20	IKM-7003025	HEX NUT FLANGED - DIN 985 - M8	A4	0.01 kg
30	2	IKM-7003027	HEX NUT FLANGED - DIN 985 - M12	A4	0.02 kg
31	1	ISO 4014 - M12 x 50		Stainless Steel, 440C	0.06 kg
32	2	ISO 4014 - M12 x 60		Stainless Steel, 440C	0.07 kg
33	4	ISO 4014 - M6 x 50		Stainless Steel, 440C	0.01 kg
34	2	ISO 4017 - M12 x 25		Stainless Steel, 440C	0.04 kg
35	3	ISO 4017 - M6 x 20		Stainless Steel, 440C	0.01 kg
36	2	ISO 4017 - M6 x 25		Stainless Steel, 440C	0.01 kg
37	2	ISO 4017 - M6 x 30		Stainless Steel, 440C	0.01 kg
38	3	ISO 4145 Hexagon Nipple N8 1/2		Non-Alloy Steel	0.04 kg
39	3	ISO 7041 - M12		Steel	0.02 kg
40	2	ISO 7041 - M20		Steel	0.1 kg
41	8	ISO 7041 - M6		Steel	0 kg
42	6	ISO 7089 - 12 - 140 HV		Stainless Steel	0.01 kg
43	2	ISO 7089 - 20 - 140 HV		Stainless Steel	0.02 kg
44	19	ISO 7089 - 6 - 140 HV		Stainless Steel	0 kg
45	2	ISO 7093 A - ST 12 - 140 HV		Stainless Steel	0.02 kg

REV	DATE	DESCRIPTION	BY	CHKD	REW	APPD
2	16.09.2019	RE-ISSUED FOR CONSTRUCTION	BØ	LET		EN
1	22.08.2019	ISSUED FOR CONSTRUCTION	BØ	KG		EN

WEIGHT:
IN AIR: 37 kg
IN WATER: 28,3 kg
SURFACE AREA: cm²

UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN MILLIMETRES
TOLERANCES:
LINEAR: ISO 2768-1 m
ANGULAR: ISO 2768-1 m
EDGES: ISO 2768-1 m
REMOVE ALL BURRS
BREAK ALL SHARP EDGES

FIRST ANGLE PROJECTION

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PROJECT NO:

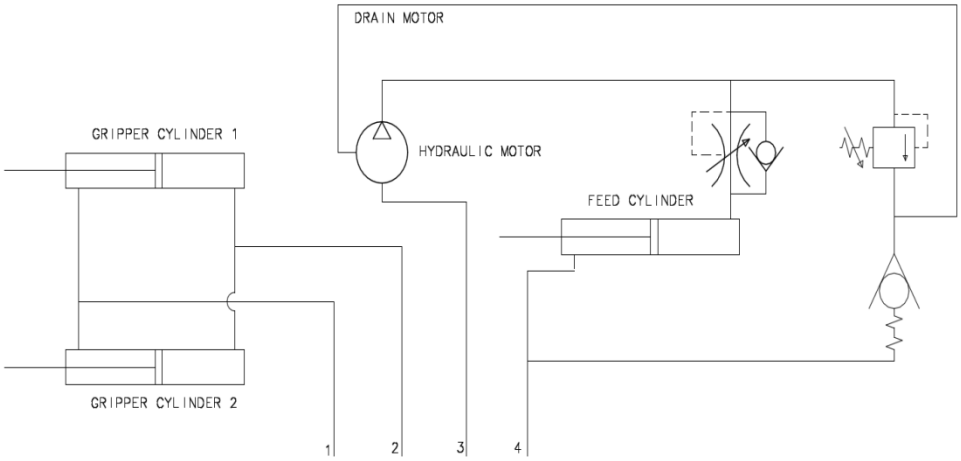
DRAWING TITLE: SUBSEA SAW - Ø30-Ø120MM

SHEET SIZE: A3 | SHEET NO.: 1 OF 3 | SCALE: 1 : 5

DRAWING NO.: IKM-1070377 | LATEST REV.: 2

WORK IN PROGRESS

Appendix B


DRAIN MOTOR
GRIPPER CYLINDER 1
HYDRAULIC MOTOR
FEED CYLINDER
GRIPPER CYLINDER 2
1
2
3
4